CLAIMS

1 - Method to identify the mechanical properties of a material, comprising a first step to acquire at least a digital image of a sample of said material, characterized in that it comprises a second step wherein for every elementary unit of said digital image at least a predetermined parameter is acquired indicating at least the presence or absence and/or type of matter in said elementary image unit, a third step to construct a grid of elementary geometric elements, or cells (12), able to be associated with said digital image, a fourth step to assign, for each of said cells (12), an index representative of the characteristics of the type of matter that occupies the position of a relative cell (12) in relation to the parameters possessed by the elementary image units associated with such cell (12), a fifth step wherein the mechanical characteristics of each cell (12) are defined according to said index and the mechanical properties of the type of matter, and a sixth step wherein the mechanical properties of said material are determined on the basis of numerical simulations carried out using the Cell Method.

2 - Method as in claim 1, characterized in that during said numerical simulations the strains, stresses and/or distribution of stresses suffered by said sample are analyzed on the basis of the mechanical characteristics of said cells (12), defined in said fifth step.

3 - Method as in claim 1 or 2, characterized in that the construction of the grid of said cells (12) comprises a first sub-step to construct a grid of nodal points (11) whose distance defines the lower limit of the size that characterizes the structure in the model examined and a second sub-step to define a plurality of cells (12), plane

or spatial, obtained by connecting said nodal points (11) to each other.

4 - Method as in claim 3, characterized in that said cells (12) cover the entire region of said sample examined.

5 - Method as in claim 3 or 4, characterized in that each of said cells (12) is obtained from a nodal point (11) which is assumed at the time as a vertex and that a plurality of adjacent nodal points (11) are used to generate a localized complex of adjacent cells (12).

6 - Method as in any claim hereinbefore, characterized in that it comprises a step to divide a three-dimensional image into a plurality of two-dimensional images obtained by sectioning said three-dimensional image according to a plurality of parallel planes, every point of the image assuming a parameter indicative of the presence of matter deriving from the sum of the indexes of the corresponding points on all said planes.

7 - Method as in any claim hereinbefore, characterized in that said indicative parameter relates to the tone of gray of said point of said digital image.

8 - Method as in any claim hereinbefore, characterized in that in said sixth step compression and shear tests are simulated in predetermined directions of a portion of said material examined.

9 - Method as in any claim hereinbefore, characterized in that in said sixth step load tests are simulated, said load being concentrated or distributed at points, lines, surfaces or their combinations of said cells.